DIGITIZING NORTH AMERICAN LICHEN AND BRYOPHYTE SPECIMENS (powered thru http://symbiota.org)

Corinna Gries
Edward Gilbert
Thomas H. Nash III

2.5 million specimens,

69 institutions,

2.5 years later

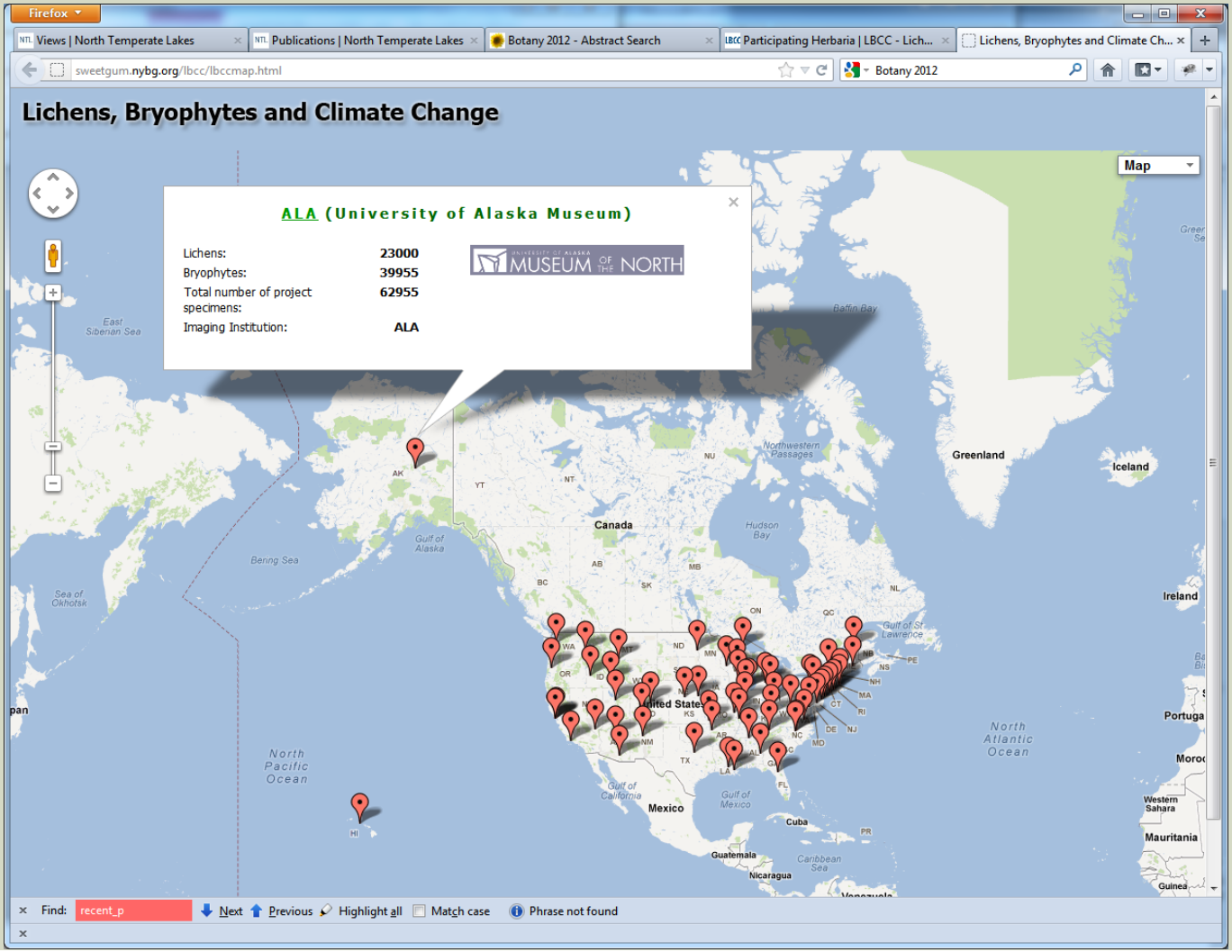
BRYOPHYTES AND LICHENS

- Different evolutionarily but similar in size and habitats occupied (epiphytes, soil mats, and rocks)
- Both dominate much of the arctic and northern boreal regions (lichens in upland areas and bryophytes in wet habitats.
- Both also occur commonly in many other ecosystems (deserts to tropics)
- Bryophytes, particularly in peat bogs store a major part of the worlds organic carbon
- Both are very useful in deposition monitoring

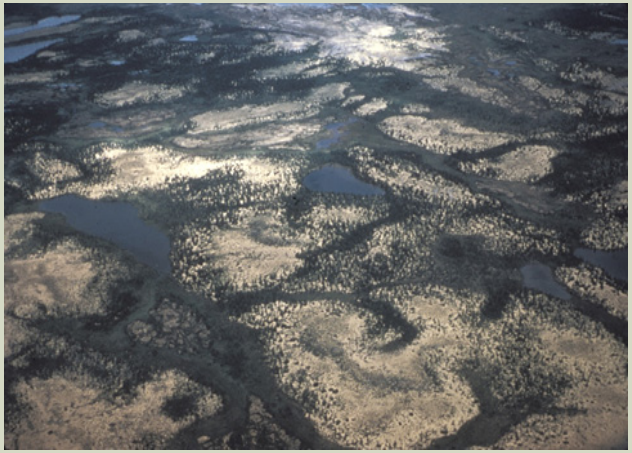
LICHENS BRYOPHYTES CLIMATE CHANGE

- Original NSF ADBC funding 2011
  - ~ 2.3 million specimen (90%)
    - 900,000 lichens
    - 1.4 million bryophytes
  - 65 non-governmental US herbaria (95
  - 16 digitization centers (collaborators)
  - Mobilizing additional existing digital records (7 added so far)
- 3 PEN proposals funded 2012 & 20
  - Add 220,000 specimens and 4 digiti-
  - zation centers.

PARTICIPATING HERBARIA

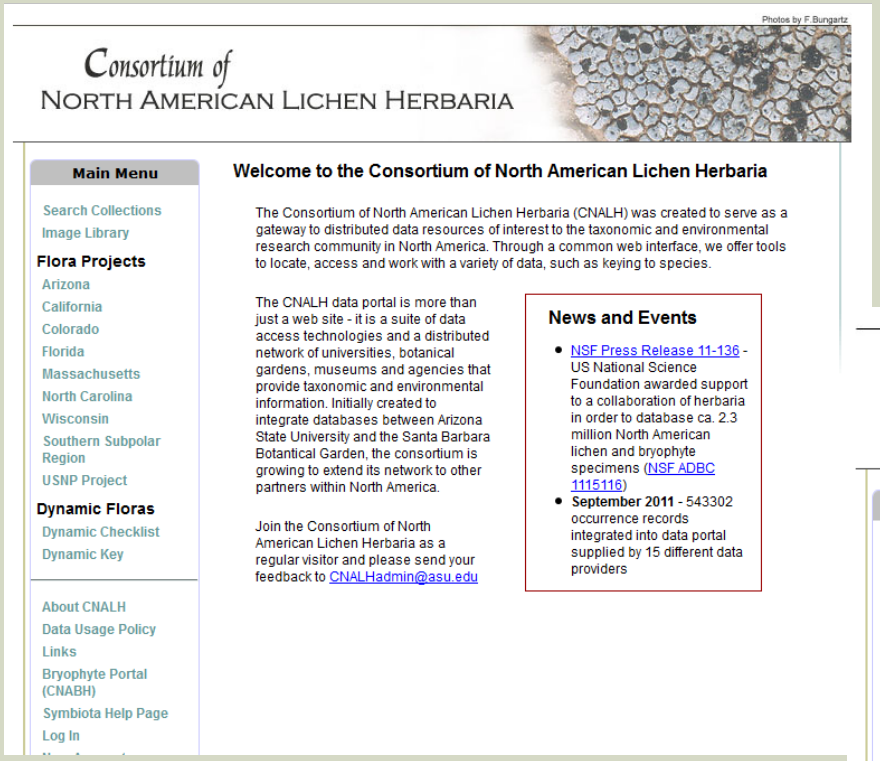


Deposition Monitoring: Radionuclides

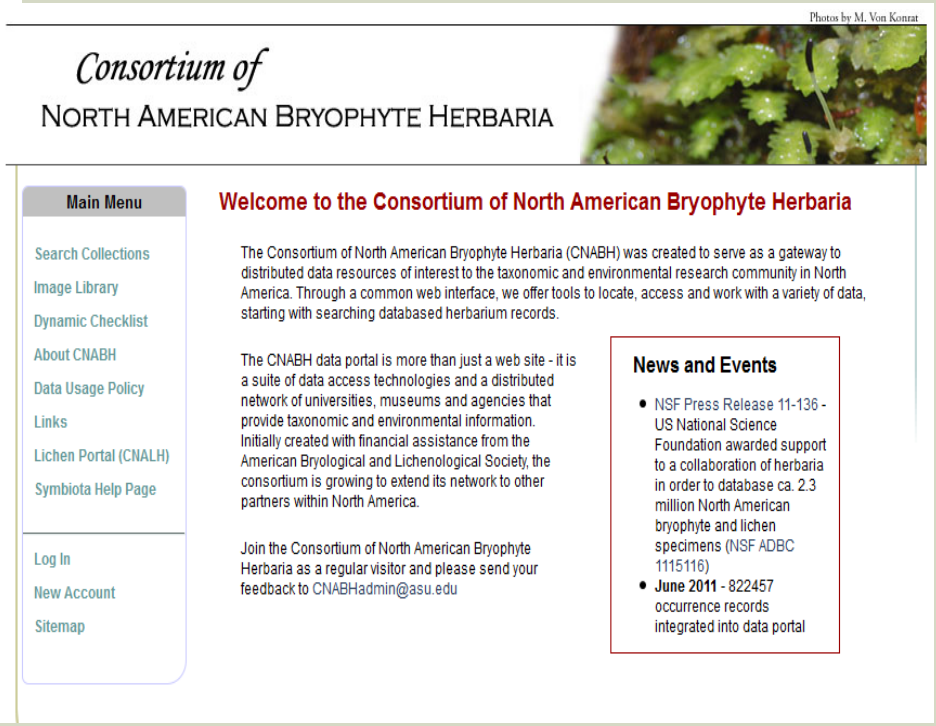


- 1. By the mid-1960's the natives of Anaktuvuk Pass, Brooks Range, Alaska had the highest radioactive body burdens of any population in North America. The source was Soviet above ground A-bomb tests at similar latitudes. Radioactive accumulation occurred in the lichens, which were eaten by caribou, that formed most of the human diet.
- 2. Lichens also used extensively to document Chernobyl fallout across Europe in the 1980's'.

PORTALS



- Lichen portal (http://lichenportal.org)



- Bryophyte portal (http: //bryophyteportal.org)

Overall Project Workflow

- Label imaging with key metadata (searchable thereby) – images to HUB server
- OCR (optical character recognition) & NLP (natural language programming run on all images – major IT effort
- Images and transcription pages available side by side through the two portals
- Transcription thru editors, students, volunteers (with a national coordinator)
- Georeferencing in batches through Geolocate
- Duplicates imported or handled through exsiccati module
- *GOAL:* completed, searchable databases available through the lichen and bryophyte portals powered by Symbiota

See http://lbcc.limnology.wisc.edu/

PROGRESS: OCR AND NLP

University of Wisconsin - Madison (WIS)

Home >> Crowd Sourcing Central >> Editor

|< << | 4 of 2615 | >> >|

Occurrence Data | Determination History | Images | Genetic Links | Admin

Collector Info

Short Form <<

Catalog Number	Other Numbers	Collector	Number	Date
WIS-L-0013032		Teuvo Ahti		1967-07-27

Dupes? Auto search

Associated Collectors | Verbatim Date

Exsiccati Title | Number

Latest Identification

Scientific Name: Cladonia bellidiflora | Author: (Ach.) Schaerer

ID Qualifier | Family: Cladoniaceae

Identified By | Date Identified

Locality

Country	State/Province	County	Municipality
USA	Alaska		

Locality: Thompson Pass Mile 25.2 Richardson Hwy.

Locality Security

Latitude	Longitude	Uncertainty	Datum	Verbatim Coordinates
61.16667	-145.66667			61°10'N, 145°40'W

Tools

Elevation in Meters: 838 - << Verbatim Elevation: 2750 ft.

Misc

Habitat: In montane tundra.

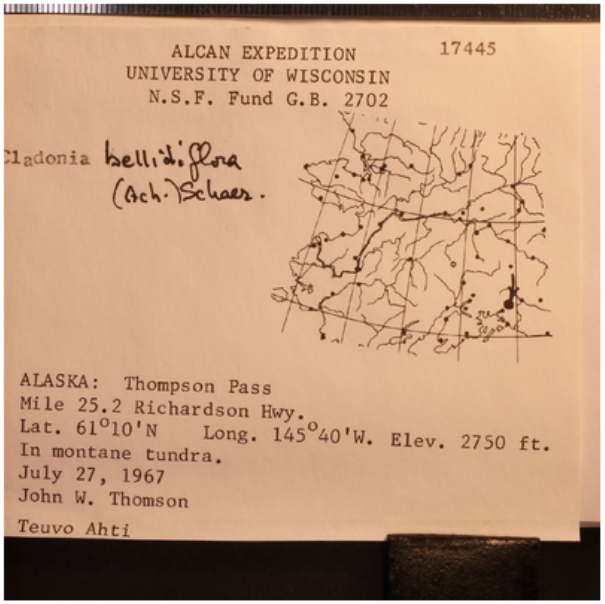
Substrate

Associated Taxa

Description

Notes

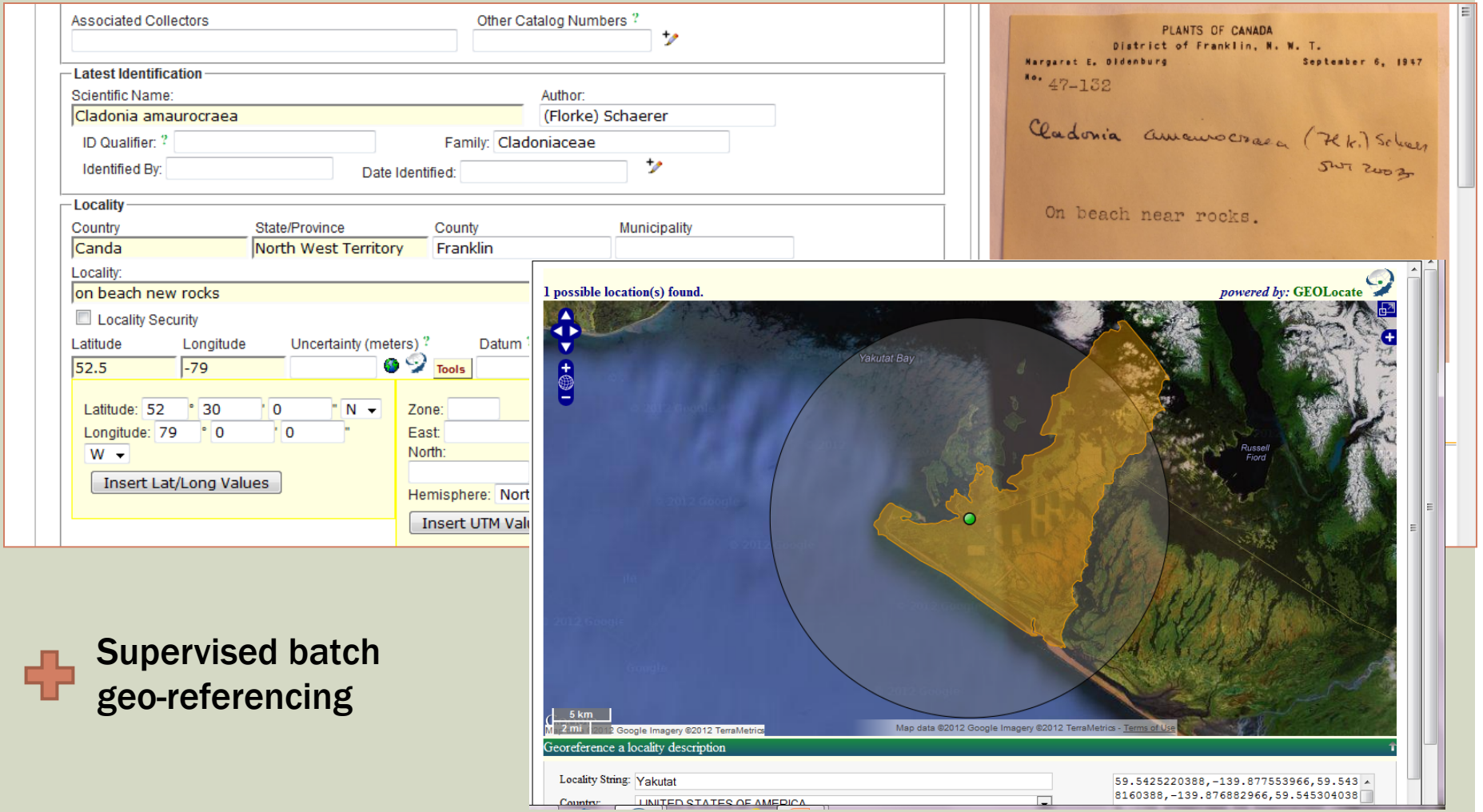
Label Processing



OCR Image | Options: OCR whole image, OCR w/ analysis | Image 1 of 1

```
i»¿ALCAN EXPEDITION
UNIVERSITY OF WISCONSIN
N.S.F. Fund G.B. 2702
Cladonia
J
17445
1 c I
'nr/
ALASKA: Thompson Pass Mile 25.2 Richardson Hwy.
Lat. 61°I0'N Long. 145°40'W. Elev. 2750 ft. In
montane tundra.
July 27, 1967 John W. Thomson
Teuvo Ahti
```

GEO-REFERENCING

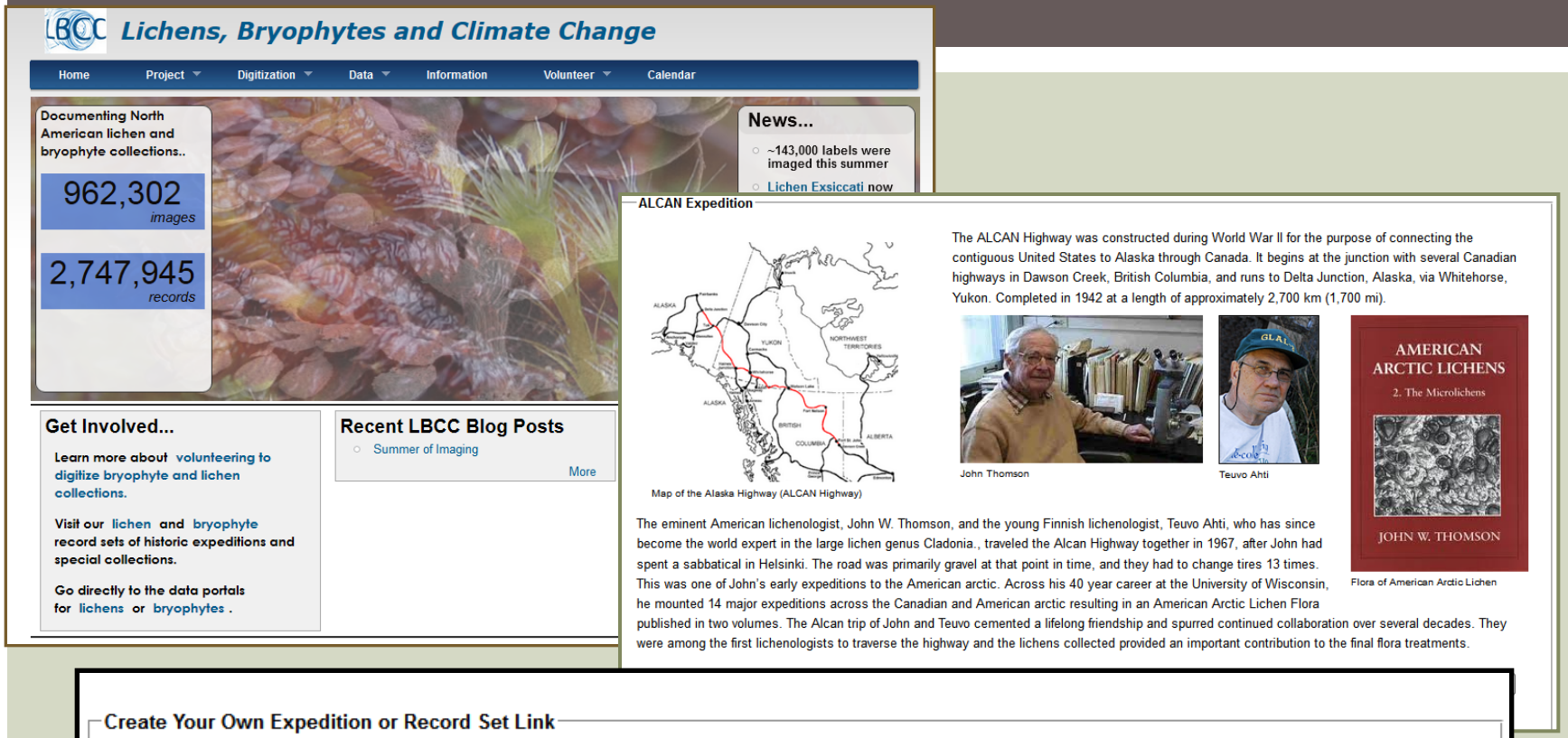


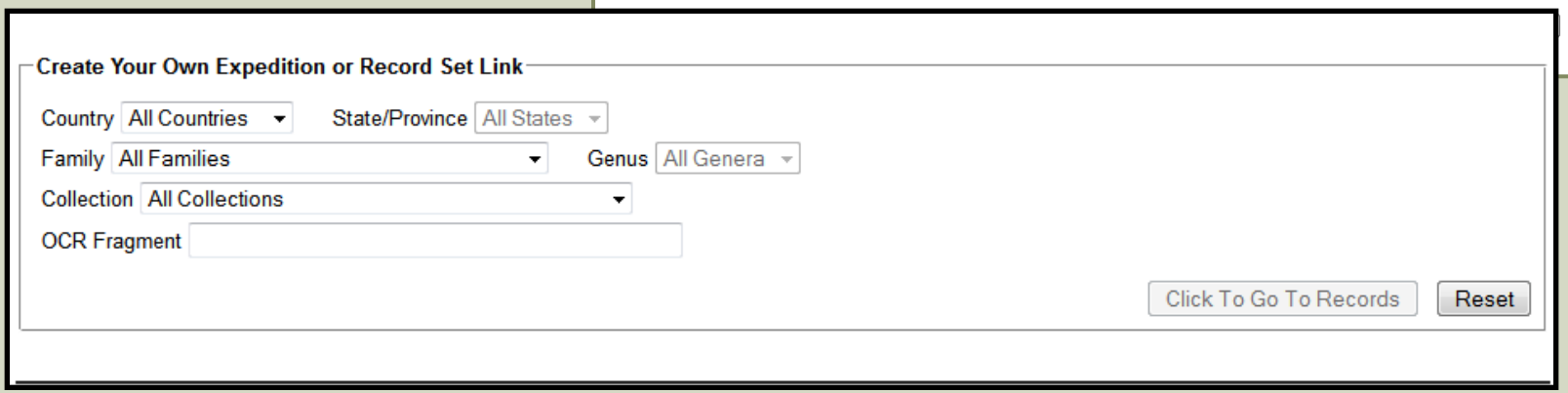
- Supervised batch geo-referencing

CROWD SOURCING
(EDUCATION AND OUTREACH)

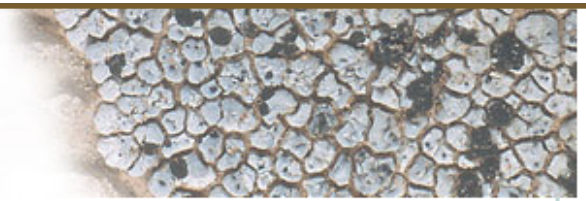
- John Brinda – Missouri Botanical Garden – national coordinator
- Volunteer program within LBCC, such as the Field Museum (Eve Gaus) and the California Academy of Science (Alison Young)
- volunteer interface is: http://lbcc1.acis.ufl.edu/
- American Bryological & Lichenological Society members
- Sophisticated User and Workflow Management System in SYMBIOTA (Ed Gilbert)
  - Transcription
  - Geo-referencing
  - Professional quality control

PROGRESS: VOLUNTEER INTERFACE





Consortium of
NORTH AMERICAN LICHEN HERBARIA



Home >> Crowdsourcing Score Board

Crowdsourcing Score Board

Top Scores

User	Score
Miadlikowska, Jolanta	2264
Studer, Alyssa	2256
McMullen, Molly	818
Smith, Julie	604
Nash, Thomas	154
Doucette, Alfonso	122
Wonders, Quinn	48
Gilbert, Edward	40
Anglin, Robert	10
Adamo, Michael	4

Current User's Status

Current Standing

Specimens processed: 1
Pending points: 2 (review records)
Approved points: 0
Total Possible Score: 2

User Stats by Collections

Collection	Specimen Count	Pending Points	Approved Points	Open Records
Duke University Herbarium (DUKE)	0	0	0	11084
New York Botanical Garden (NY)	0	0	0	419
Boise State University Lichen Herbarium (SRP)	0	0	0	21614
University of Wisconsin - Madison (WIS)	1	2	0	75011

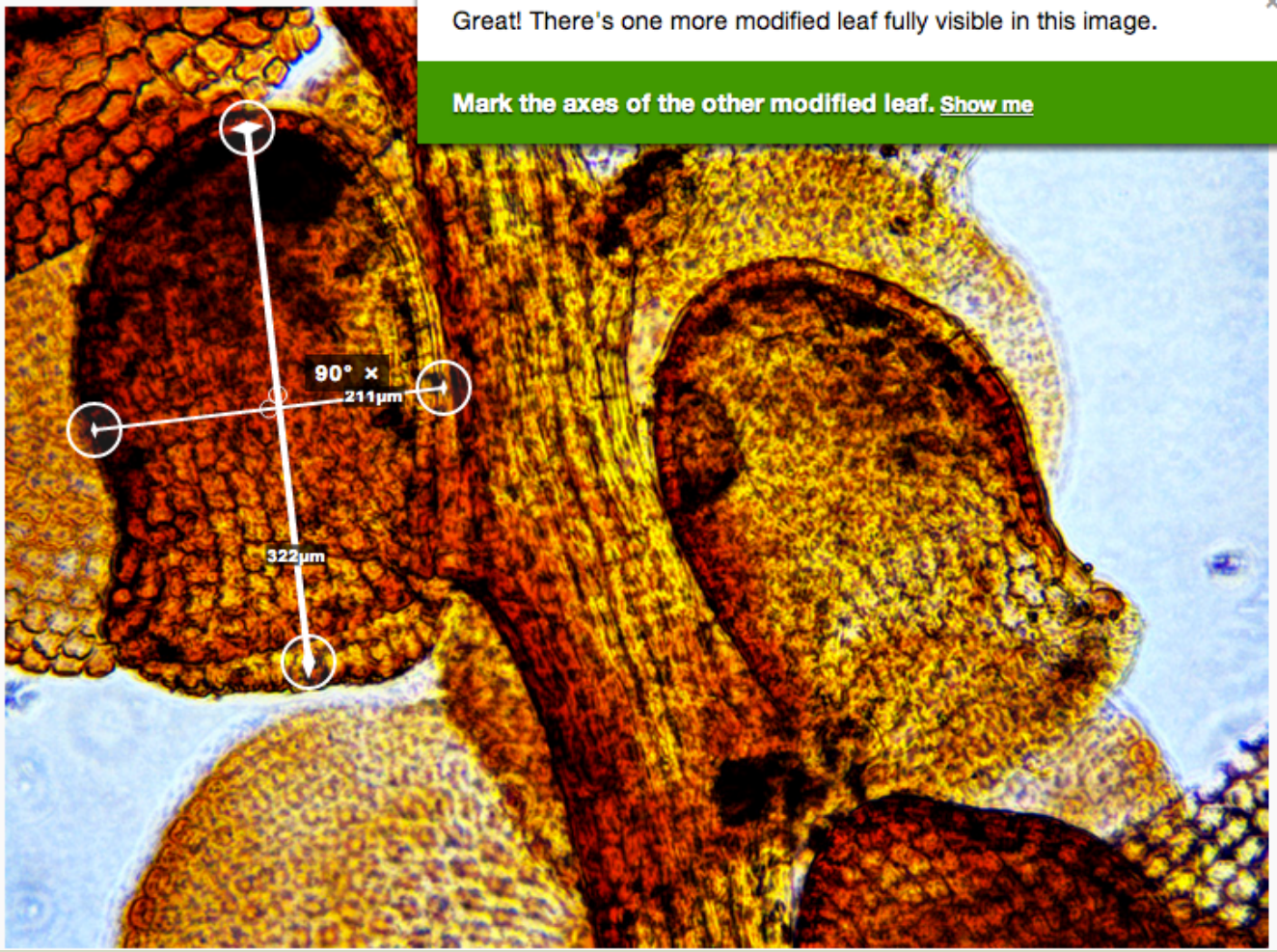

LIGHT
Please
Stay Off Platform


MICROPLANTS


I'm a Citizen Sc
MicroPlants
COLLECTIO
CONNECTIO
ZOONIVERSE
The Field Museum
microplants.zooniver

http://microplants.zooniverse.org/

COLLECTION CONNECTION **MICROPLANTS** SCIENCE CLASSIFY FAQ TEAM — A Zooniverse project



Great! There's one more modified leaf fully visible in this image.

Mark the axes of the other modified leaf. Show me

Measure the modified leaves

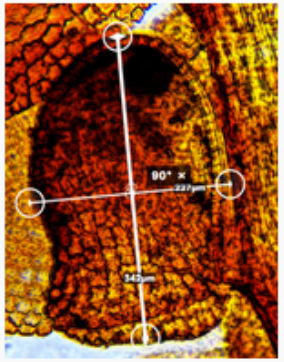
Look for round bulges representing sac-like structures and measure the longest and widest axes.

Finish this image

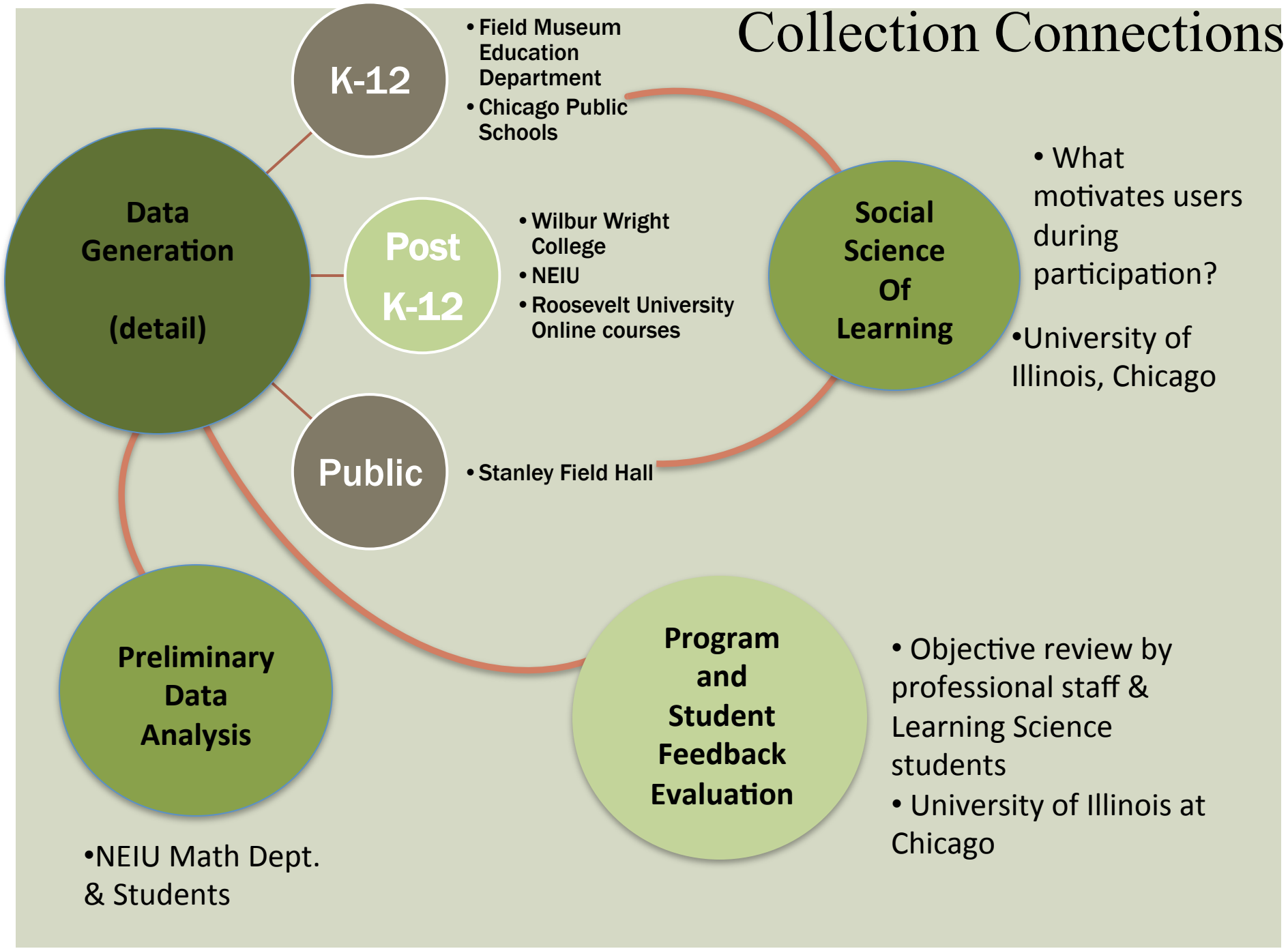
If you need some help,
restart the tutorial or
read frequently asked questions.

When you'd like to stop, please
fill out a short survey.

Remember: Mark the long and short axes, like this:



Collection Connections



Visions for the future…

Expand The Field Museum's involvement in Citizen Science initiatives

Integrate in to K-12 classroom

- RET for ARTS
- *Virtual Visits from The Field*
- N.W. Harris Learning Collection boxes

THANK YOU NSF

- Michael Adamo
- Bruce Allen
- Meredith Blackwell
- Bill Buck
- Alina Freire-Fierro
- John Freudenstein
- Alan Fryday
- David Giblin
- Karen Hughes
- Steffi Ickert-Bond
- Timothy James
- Jennifer S. Kluse
- Matt Von Konrat
- Ben Legler
- Tatyana Livshultz
- Robert Lücking
- Francois Lutzoni
- Bob Magill
- Andrew Miller
- Brent Mishler
- Donald Pfister
- Richard Rabeler
- Malcolm Sargent
- Edward Schilling
- Michaela Schmull
- Blanka Shaw
- Jon Shaw
- Carol Shearer
- Larry StClair
- Barbara Thiers

Funded by the NSF ADBC program